CLEANING SYSTEM FOR A VEHICLE

BACKGROUND

[0001] Ultraviolet light (such as UV-B and UV-C) may be used as a germicidal agent. Disinfection may be achieved by killing or inactivating various microorganisms.

BRIEF DESCRIPTION OF THE DRAWINGS

[0002] FIG. 1 is a perspective view of a cleaning system for a cabin of a vehicle.

[0003] FIG. 2 is a schematic view of the cleaning system of the vehicle shown in FIG. 1.

[0004] FIG. 3 is a schematic view of a light source and a light detector of the cleaning system.

[0005] FIG. 4 is a flow diagram illustrating a vehicle interior cleaning process executable by a computer of the cleaning system.

[0006] FIG. 5 is a graphical depiction of several bands of ultraviolet (UV) wavelength, each associated with a different type of UV light element.

DETAILED DESCRIPTION

[0007] A cleaning system is described and a method of using the system. According to one illustrative example, the method includes: at a vehicle computer: receiving data from at least one environmental sensor; based on the data, determining an ultraviolet (UV) dosage for an interior surface of a cabin; and based on the determination, controlling UV light according to the dosage.

[0008] According to the at least one example set forth above, controlling further comprises actuating a light source within the cabin which directs the light toward the surface.

[0009] According to the at least one example set forth above, the light comprises a band within 240-280 nanometers.

[0010] According to the at least one example set forth above, the dosage is based on a light intensity, an exposure duration, and at least one function based on the data.

[0011] According to the at least one example set forth above, the method further includes de-actuating a light source at an expiration of the duration.

[0012] According to the at least one example set forth above, the method further includes adjusting at least one climate control parameter based on the determination.

[0013] According to the at least one example set forth above, controlling further comprises changing an intensity of the light based on feedback from a detector at the surface.

[0014] According to the at least one example set forth above, the determination further comprises increasing an intensity of the light based on a relative humidity being greater than a threshold.

[0015] According to the at least one example set forth above, the determination further comprises decreasing an intensity of the light based on a relative temperature being less than a first threshold or greater than a second threshold.

[0016] According to the at least one example set forth above, the determination further comprises increasing an intensity of the light based on moisture at the surface being greater than a threshold.

[0017] According to the at least one example set forth above, the determination further comprises decreasing an intensity of the light based on a measurement of UV sunlight at the surface.

[0018] According to the at least one example set forth above, the method further includes inhibiting UV light emission based on an occupied state of the vehicle or a user ingres sing.

[0019] According to the at least one example set forth above, the method further includes inhibiting UV light emission based on relative airflow being greater than a threshold.

[0020] According to the at least one example set forth above, the method further includes inhibiting UV light emission based an open state of vehicle windows.

[0021] According to the at least one example set forth above, the dosage is based on a selected sterilization level.

[0022] According to another illustrative example, a system is disclosed. The system may include a computer, comprising processor and memory storing instructions executable by the processor, the instructions comprising, to: receive data from at least one environmental sensor; based on the data, determine an ultraviolet (UV) dosage for an interior surface of a cabin; and based on the determination, control UV light according to the dosage.

[0023] According to the at least one example set forth above, the system also may include: a lighting system coupled to the computer.

[0024] According to the at least one example set forth above, the lighting system comprises a light source and a detector which provides UV light intensity feedback.

[0025] According to the at least one example set forth above, the instructions further comprise, to: determine the dosage based on one of a relative humidity, a relative temperature, or a moisture at the surface.

[0026] According to the at least one example set forth above, the instructions further comprise, to: adjust the dosage based on a measurement of UV sunlight at the surface.

[0027] According to the at least one example, a computer is disclosed that is programmed to execute any combination of the examples set forth above.

[0028] According to the at least one example, a computer is disclosed that is programmed to execute any combination of the examples of the method(s) set forth above.

[0029] According to the at least one example, a computer program product is disclosed that includes a computer readable medium storing instructions executable by a computer processor, wherein the instructions include any combination of the instruction examples set forth above.

[0030] According to the at least one example, a computer program product is disclosed that includes a computer readable medium that stores instructions executable by a computer processor, wherein the instructions include any combination of the examples of the method(s) set forth above.

[0031] Now turning to the figures, wherein like numerals indicate like parts throughout the several views, there is shown a cleaning system 10 for a vehicle 12 that includes a computer 14, a lighting system 16 (e.g., providing ultraviolet (UV) light), and one or more environmental sensors 18. As will be described in detail below, the computer 14 may receive sensor data from sensor(s) 18, determine a light emission dosage, and, when a cabin 20 of the vehicle 12 contains no users (e.g., human passengers or occupants), the computer 14 may control the lighting system 16 to emit light to impinge upon and clean an interior surface 22 of the cabin 20 (e.g., it may actuate the lighting system 16 to an ON